IO-Link Master Microcontroller

μPD78F80xx Series

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The μPD78F806x controller is the world first integrated IO-Link Master controller. It delivers a cost effective and optimal solution for compact IO-Link technology capable Remote I/O systems. The component incorporates a powerful 16-bit low power CPU core microcontroller and a dual IO-Link Master IEC61131-9 compliant transceiver, with independently operated channels for better flexibility and scalability.

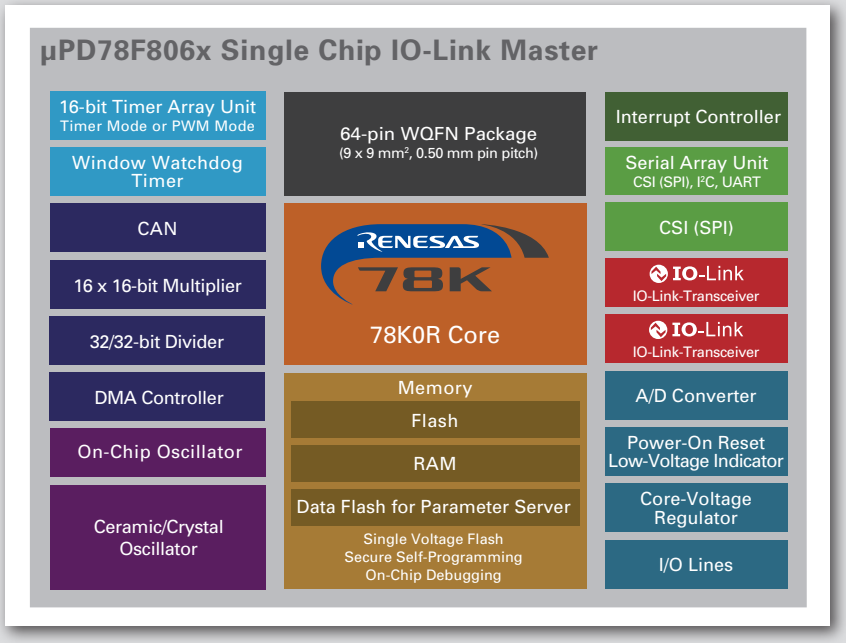
The μPD78F806x offers up to 24 MHz operating frequency, flexible host controller interface via high-speed serial interfaces (UART or SPI), up to 26 user IOs, CAN controller, data protection and safety functions, 4 DMA channels for concurrent peripherals operation with CPU and high data throughput, up to 256 Kbytes of Flash memory for application and protocol handling, up to 16 Kbytes of high-speed RAM and 16 KB of Data Flash for parameter server feature implementation. The integrated transceiver supports Wake-up request signal generation, 2 digital inputs configurable for IO-Link or IEC61131-2 compatible interface, over-current & short-circuit protection at output stages with configurable thresholds, over temperature protection and under voltage monitor

The μPD78F806x shortened design cycle together with the use of the customisable and fully tested smart IO-Link master stack available from Renesas' alliance partner, accelerate new products' time to market. The stack firmware integrates a SPI host driver with high efficiency protocol support as well as features according to IO-Link specification v1.1, including parameter server, and more.

Applications

- Modular Remote I/Os
- IP67, IP20 Fieldbus modules
- Smart Integrated Drives
- IO-Link Gateway

Block Diagram



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Key Benefits

- Single-chip solution for system cost reduction
- Independent channel power switch for maximum scalability
- Flexible host interface for serial or parallel connection
- Small package (9 x 9 mm)
- IO-Link specification v1.1 compliant
- Fast time to market
- Powerful 16-bit Low power CPU solution and high memory integration
- Renesas alliance partner support for smart IO-Link master stack firmware integration

Key Features

- 16-bit Low power CPU core
  - » 24 MHz maximum operating frequency (30 DMIPS)
  - » CISC Architecture (Harvard) with 3-stage pipeline
- Memory Line-up
  - » 128 Kbytes to 256 Kbytes Flash
  - » 8 Kbytes to 16 Kbytes RAM
  - » On-chip single-power-supply flash memory with protection from chip erase/block erase/writing function
  - » Self-programming with boot swap function/flash shield window function
  - » 16 Kybtes Data Flash with background operation function
- Analog functions
  - » 3 channels 10-bit resolution A/D converter
- Timer Functions
  - » Multi-function 16-bit timers: 24 channels
  - » 6 x PWM outputs
  - » 1 x 16-bit wakeup timer
  - » Watchdog timer (1 channel 8-bit (operable with OCO)
- Optimized System & Peripherals
  - » On-chip regulator
  - » Power-on-clear (POC) circuit
  - » Low-voltage detector (LVD)
  - » BCD adjustment circuit function
  - » Clock output controller
  - » Multiplier/Divider (16 bits × 16 bits, 32 bits/32 bits)
  - » On-chip debug function
- Communication interfaces
  - » 1 x CAN controller,
  - » 1 x CSI(for Transceiver)
  - » 1 x SPI(for MCU): 1 channel
  - » 1 x CSI/ simplified I²C/ UART
  - » 2 x UART for IO-Link Transceiver (internal connection usage)
- Data protection and Safety
  - » Illegal-memory access protection
  - » Safety support protection
- Data Memory Access (DMA) Controller
  - » 4 fully programmable channels
  - » Transfer unit: 8- or 16-bit
- Built-in 2 channels IO-Link transceivers
  - » Integrated UART-Interface for each port
  - » IO-Link supply switch supporting external PMOS transistors
  - » Wake-up generation support
  - » Digital inputs configurable for IO-Link or IEC61131-2 compatible interface
  - » SPI interface for configuration, programming and diagnostic functions
  - » Over-current & short-circuit protection at output stages with configurable thresholds
  - » Over-temperature protection
- Power supply voltage (when integrated transceiver is used)
  - » V_{DDH} = 8.0 to 36.0 V
  - » V_{DD} = I_{VDD1} = I_{VDD3} = 2.7 to 3.45 V
- Operating temperature range
  - » T_A = −40 to +85°C

Devices

Part Number	Flash ROM [kBytes]	RAM [kBytes]	Data Flash [kBytes]	CAN
µPD78F8064K8(R)-6B4-AX	128	8	16	Yes
µPD78F8065K8(R)-6B4-AX	192	12	16	Yes
µPD78F8066K8(R)-6B4-AX	256	16	16	Yes
µPD78F8067K8(R)-6B4-AX	128	8	16	No
µPD78F8068K8(R)-6B4-AX	192	12	16	No
µPD78F8069K8(R)-6B4-AX	256	16	16	No
Package = WQFN (64-pin, 9 x 9 mm, 0.5 mm pitch)				

For further information on Renesas Electronics IO-Link solutions, visit our European website at www.renesas.eu/io-link

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